TEACHING

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TEACHING

A QUARTERLY TECHNICAL JOURNAL FOR TEACHERS

Editor: MARGARET BENJAMIN

VOL. XXVI JUNE 1954 No. 4

EDITORIAL

THE September issue of TEACHING will be a special number on Extra-Curricular Activities in Secondary Schools.

Articles on the various extra-curricular activities possible in secondary schools will be welcome. Accounts of actual experiments which have been carried out with success will be particularly appreciated.

THE MODIFIED SCHEME OF ELEMENTARY EDUCATION IN MADRAS

A Constructive Criticism

IT IS an unfortunate fact that in the present temper of India every discussion tends to become overlaid with a communal and political bias, so that no subject can be examined impartially and no speaker or writer is even credited with impartiality: 'He who is not with me is against me' is taken in a party (or rather, *parti pris*) spirit. The recent Madras scheme of elementary education, also known as the reduced-hour scheme, is a striking example of this unfortunate tendency. In itself a purely educational experiment, it has gone on, avalanche-like, gathering all the debris of political passion, ranging in fiercely opposed camps people who have not understood either its true purpose or the means by which it tries to attain it. Now that the first outbursts are spent and the temperature is normal, it may be useful to study the scheme from the purely educational point of view.

Before analysing it I may be allowed to remark that much of the heat aroused by it might have been prevented if the public had been prepared by suitable explanation and propaganda to understand what the problem really was, and why this means to solve it was worth trying. In education, it is primarily the right and duty of parents to ask for reform; if they are not sufficiently enlightened to do this,

they must be educated by press and platform and radio and picture until they realize what is in their own interest and that of their children. This process of educating public opinion may be too slow for a clever, far-seeing, and truly patriotic leader; he may chafe at the impermeability of his followers; but the process cannot be reversed without the danger of non-cooperation, if not positive opposition. Slowness is the price of democracy.

The *raison d'être* of the scheme is the very laudable desire to double the number of children attending primary schools without adding to the existing number of schools or of teachers. By using the same building, the same library, the same conveniences for two different sets of students, and by making the same teachers teach two different batches of students, one in the forenoon and the other in the afternoon, a great practical hurdle is effortlessly taken and another step cut towards the goal of universal primary education for children between 6 and 14 years mentioned in the Constitution. This means shortening the school-day, but within three full hours the primary school child can get as much instruction as he now gets in a five-hour day generously sandwiched into 'study', 'free activity', 'free time', 'physical training' and actual teaching.

The question will at once arise whether such a small child can profit by three hours' continuous teaching, divided into four periods of 40 minutes each, even allowing two intervals of 10 minutes each. The pre-supposition is that the content of teaching and study will not be less than it is now in a two-session day. And during these four periods the primary school child has to be taught, at the rate of six days in the week, language, elementary mathematics, drawing, nature study, history, geography, hygiene, civics, moral instruction and singing. Even in Europe, where the climate is not enervating and the children are better fed and more energetic, such a programme of study would be thought too heavy for a primary school and more rest-intervals would be provided under various names.

The teacher's point of view also needs to be taken in a work which depends for its success almost entirely on his energy and ability to teach small children for four periods in the forenoon and as many in the afternoon. Whether he is to be paid anything for this extra work and responsibility does not change the problem materially, though it may have its psychological effect on his attitude to it: even if he be willing, is he able to do the new six-hour task with interest and energy? Besides the effort of teaching, the strain of adapting himself to a different batch of pupils, and getting to know them individually, from morning to afternoon, is not a negligible difficulty in the way of the new scheme.

In a paper placed on the table of the Madras Legislative Council on 27 July 1953, the Government explained that Standard I would not study history and geography and Standard II would be exempted from history, thus releasing more time for 'free activity' or play within

the half-day at school. But if no history is taught in the first two years of the primary school and no geography in the first, can we say that the fear that the already low standard will be further lowered is entirely unfounded?

The Parulekar Committee, which was appointed by the Madras Government to examine its own Scheme, after approving its general features, makes twenty-two recommendations for its better working. Leaving the curriculum of primary education to the Government's special care, it suggests that the two batches of pupils in a school should be brought together at least two days in every month for games and other cultural or recreational activities, for 'this will help in establishing the unity of school life in the minds of the children, the teachers, and the community'. The Committee does not seem to anticipate any difficulty of finding room either in the school itself or in its playground for double the number for which it was intended, or of managing the games and drill and singing of this number with the same staff. To meet the objection that the teachers will be over-burdened with this new scheme, it recommends that each teacher be given 'difficult subjects in the morning and easier subjects in the afternoon, so that the same lessons need not be repeated in the two sessions in the same day but on different days'. Those who know what a primary school really is may wonder what subjects in its curriculum are difficult and what subjects are easy, especially when the new scheme omits no subject that was taught before and wants no lowering of standards. Secondly, they *feel* (especially in the plains of India) that it is not subjects that are difficult but *pupils* of the 6-14 age-group.

The Committee also suggests that the morning and afternoon sessions be exchanged not every day (as the Modified Scheme provides) but every week; though it gives no reason for this in its Report, it probably fears that daily change may lead to frequent forgetfulness and absence from school and to further difficulty in organizing the out-of-school half-day.

This brings me to the chief feature and the chief difficulty in the way of the Scheme: how to provide for the child's useful occupation during that half of the day when he is not at school. In the Government's mind this is an essential element of the scheme, for to the barrage of criticism its answer was, not explaining it away or whittling it down, but reaffirming that 'the programme contemplated outside the school hours in the home and the village should be treated as an important and valuable part of the educational process', though it will not be counted for promotion or carry with it any fear of examination or test of efficiency. From the purely pedagogical point of view nothing can be said against, but everything for, every child doing some manual work alongside his school study to train his hand and eye, to develop a practical sense, to learn the dignity of every kind of labour and the universality of the injunction: 'In the sweat of thy brow shalt thou eat bread.' No one who knows India will deny

the special need of such training being made compulsory in a country soaked for centuries (if not millennia) in the idea of a hierarchy of occupations corresponding to a hierarchy of castes. 'Craft-mindedness' is no evil provided it does not, as it need not, exclude real education of the mind and heart no less than of the eye and hand.

But the aim of the Modified Scheme seems to be not so much to educate the whole child for his own sake as to make him help his parents in their manual occupation. This appears from the Government's own explanation of its Scheme: 'The most important element in the scheme of shortened school-hours is that parents who belong to occupational groups and wish to have their children with them during the out-of-school hours will be allowed to do so.' The educative aspect of manual work is not explicitly excluded; but neither is it uppermost in the Government's mind, though it adds that 'the success of the programme will be judged by the children being kept happy and usefully engaged'. Whether the word 'usefully' refers to the children or to their parents is not clear, but it makes all the difference to an educational method.

Another point which is not obvious is, who is to organize and carry out and ultimately be responsible for the out-of-school part of the child's education? The teachers will be too busy with their two shifts to pay any attention to what happens outside. The parents will not be interested in other people's children, and perhaps even be embarrassed by the presence of their own when they are at their bread-winning occupation. A 'Village School Council' has been suggested by the Government to 'guide the various activities contemplated in the out-of-school programme'. But it is not clear of whom this Council shall be composed, or whether the members of it will be able and willing to undertake this task, and who shall compensate them for the loss of income caused by this new responsibility they are undertaking. Villagers with some professional skill and of some authority among their equals are less plentiful than blackberries, and they are certainly not sufficiently leisured to afford the time for this non-lucrative occupation.

These questions seem to have occurred to the Parulekar Committee, for out of its twenty-two recommendations, four (16 to 19) are answers to them. It suggests that 'one full-time or at least part-time worker on an honorary or paid basis should be appointed in each village or for a suitable group of villages to be actively responsible for the organization of the out-of-school programme with the maximum local co-operation'—the alternatives to each step and the circumlocutory phrases culminating in the optimism of 'the maximum local co-operation' need no comment; that craftsmen in the village should be specially trained to do their work 'scientifically' and in their turn train and 'look after the instruction of children in various crafts in their own workshops' (who is to pay for their training, and where are they to be trained, and where is 'their own workshop' in which

various crafts can be simultaneously taught by one craftsman?); that 'some material remuneration wherever necessary should be given to craftsmen who actively co-operate in working the Scheme' (adding the deep reason that they may be compensated for the time and effort they give)—'wherever necessary' would imply that it seldom would; and that 'a small amount' [it is not said of what] should be made available to the headmasters of schools in connexion with the sundry expenses for the out-of-school programme (it is not clear what expenses a headmaster can have in a programme which is out of school). These suggestions of the Committee would, if carried out, make the new Scheme save less than it is intended to do; it might perhaps be much more costly than if the crafts were taught at school, where they could at least be controlled and regulated as in a multi-purpose school. Leaving them to villagers in general or to a council of them will be neither efficient nor cheap in the long run, even if there be the supposed skill and zeal for the common good of the village and for the future of its children.

There are thus many difficulties in the practical working out of the Modified Scheme of which the Committee seems to be not unaware. And though its Report is appreciative and constructive, its cumulative effect is to give the impression that the scheme is all but impracticable, not only for want of money but even for want of the proper machinery to set it going. With a certain solemnity for which the profession will be deeply grateful, the Parulekar Committee says (No. 13): 'It is our considered opinion that an appropriate increment in the salary of teachers without any delay is one of the essential pre-requisites for rousing and sustaining their enthusiasm and devotion in the present work.' This is followed by the admirably prudent suggestion: 'Our recommendation is that, within the limits of finance, the best that is possible should be done for the teachers.' Within the limits of finance, has the best ever not been done for teachers in India?

After all these recommendations (or before them) comes the striking *envoi* to the Scheme: 'In our opinion, the new Madras Scheme will prove a pioneering scheme which others will have to adopt sooner or later if they wish seriously to implement the directive of the Indian Constitution.' The merit of pioneering cannot be denied to Madras. But it may be asked whether, for the reasons I have stated, it really 'attempts to give to the children not book education alone but an education which combines book education with a fair amount of opportunity for the exercise of initiative and for participation in the life and work of the community in which the child lives.'

T. N. SIQUEIRA, S.J.

THE METHOD OF SYNTHESIS IN TEACHING A GEOMETRICAL THEOREM

Geometry is not merely proving but also discovering Theorems

IN SETTING about learning a geometrical theorem a student has two difficulties to face, and the teacher is usually careful not to present both these difficulties together. The two difficulties are: (*a*) understanding what the theorem is about, (*b*) finding or devising the proof.

The methods usually employed for overcoming the first obstacle are

(i) an inductive approach, such as the approach to the theorem on the sum of the angles of a triangle by the actual measurement of the angles in several instances or by cutting out the angles of a paper triangle and putting the angles together.

(ii) by application or use of the property awaiting proof. Thus what the theorem of Pythagoras is about can first be made clear by using the principle in calculations.

Rider work after the theorem is learned, will, of course, further clarify the properties involved, but a certain degree of comprehension of the proposition must precede its proof.

This is appreciated by most teachers and, as a rule, the approach work is adequately done. It is with the second stage, the finding or devising of the proof, that trouble comes.

The method of merely explaining the proof is obviously a faulty one, however lucidly and painstakingly it is done. The result to the average pupil is at most that he understands the proof. This means only that he gives logical assent to what the teacher has had to say, but as his mind has been merely logically receptive and not constructively active, there is little relational assimilation. It is true that the brighter pupils come off better because of their ability to organize their knowledge while the explanation is going on, but both sets have been deprived of the satisfaction of attack.

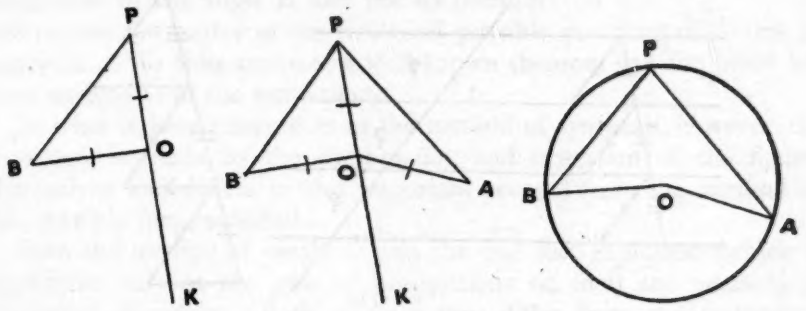
Educing the proof by questioning and inviting suggestions is, of course, an advance on the previous method provided it is only used as an individual method. Used as a class method it still fails with the average pupil, since if you replace the teacher by the brighter pupils from whom the answers and suggestions will naturally come, you will have the same position as you had before with the method of explanation, so far as the average pupil is concerned.

The well-known method of analysis is a still further advance, as it makes explicit the mental processes that are implicit in the second method cited above. Its main exploitation is in working out 'constructions'; but this method of 'working backwards' is powerful in theorem work also. The slower pupils are still at a disadvantage, but they gradually profit by the analysis which reveals the various steps in reasoning. For all pupils it provides a valuable technique of attack.

And yet none of these methods applied to theorem work show geometry as anything more than having to prove propositions. The geometrical properties are not discovered. They are merely proposed for proof and so established.

There is another approach to learning theorems which will be described presently and which we might call the method of Synthesis. With this method it is not the proof that is built up, but the geometrical property itself. The theorem is discovered and the way it is discovered also reveals the proof. This method not only ensures that the new knowledge is really the outcome of the old, it gives the satisfaction of discovery.

The following examples illustrate the method.



Ex. 1 OPB is an isosceles triangle with OP = OB.

If PO is produced, what is the relation between ∠BOK and ∠BPO?

$$\angle BOK = 2\ \angle BPO$$

Now suppose another isosceles △POA is added as shown in the figure

$$(OP = OA)$$

$$\angle AOK = 2\ \angle APO.$$

What then is the relation between ∠BOA and ∠BPA?

$$\angle BOA = 2\ \angle BPA.$$

Now: can a circle be described passing through A,B,P?

Where is its centre?

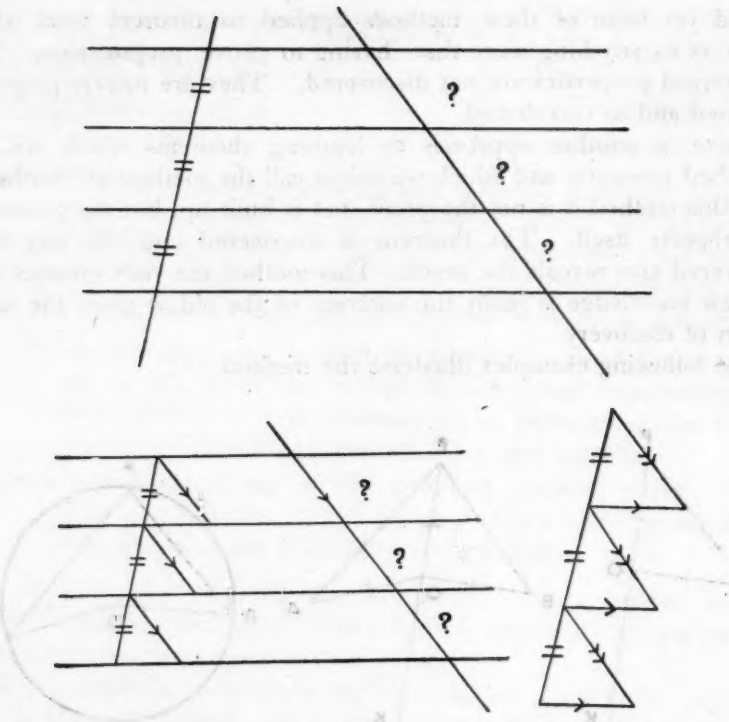
The next figure shows the circle. The line OP is omitted.

Can you re-state the relation between ∠BOA and ∠BPA?

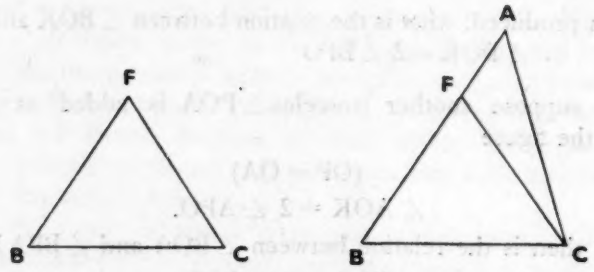
Educe the statement: The angle subtended by an arc of a circle at the centre is double the angle at the circumference.

If you were asked to prove this how would you proceed?

Ex. 2 Here is the sequence of figures for the discovery of another theorem—this time the reader is asked to fill in the gaps.



Ex. 3 In the following the prelude to a well-known theorem is indicated.



FBC is an isosceles △. FB = FC. ∠B = ∠C.
BF is produced to A.
In the △ ABC, which angle is larger? ∠B or ACB?
Which side is bigger, AB or AC?

The method of synthesis is not the only method to combine discovery and proof. Take the following example:

B and C are two fixed points and A is a point at which BC subtends an angle of given magnitude α. Let us consider a way of finding the centre of the circumscribing circle, other than the usual way of drawing two perpendicular bisectors of the sides.

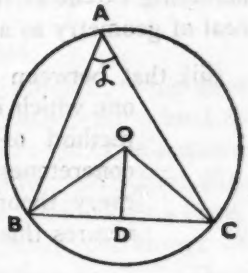
Imagine the circumscribing circle drawn and the perpendicular bisector of BC. Join O the centre, which will lie on the perpendicular bisector, to B.

We have $\angle BOD = \frac{1}{2} \angle BOC = \alpha$. So $CBO = 90° - \alpha$

This gives the required construction which is

(i) Draw the perpendicular bisector of BC.

(ii) At B draw a line at an angle $90 - \alpha$ to BC.



So far we have used the method of analysis to find a particular construction. But we can now proceed to make a discovery. Since the magnitude of the angle A and not its position determines the centre of the circle, all possible positions of A will be concyclic. We thus arrive at a well-known theorem and the proof has been arrived at at the same time.

In what is here referred to as the method of synthesis, however, the discovery is made by the combination and extension of the figures themselves and differs in this important respect from the method of the example just explained.

Both the method of synthesis and the one just explained (which is applicable only in the case of propositions on loci) are methods of deductive discovery. Both of them thus differ from the method of inductive discovery exemplified at the beginning of this paper in the case of the approach work to the angle-sum property of the triangle.

Which is superior? Each has its advantages but both are necessary in mathematical thought and education. The inductive procedure gives concrete meaning with discovery, but it does not itself provide geometrical proof, nor does it indicate the lines of proof. The deductive procedure provides simultaneous discovery and proof, but not basic concrete meaning.

It must be noted that the distinction between analysis and synthesis is not itself in question here. These are necessary and complementary modes of all relational thinking.

The distinctions which have been raised here are:

(i) that between teaching a theorem as a proposition to be proved and teaching it as a discovery. The ideal of geometry is to display the properties of a space as the logical outcome of postulates regarding that space. The activity which we call geometry, however, is not merely showing that any given property rests logically on previous properties, but also the thinking out or discovery of those properties.

(ii) that between inductive and deductive discovery as explained above. The fact that mathematical propositions are analytical (as opposed to the propositions of science which are synthetic) has no relevance here.

The reference is to the mode of discovery and not to the nature of the property discovered. Both modes are essential in mathematical thought, but the deductive method furnishes the proof itself in the course of discovery and for this reason it should be exploited to an increasing extent as the pupil matures, because it reaches out to the ideal of geometry as a deductive system.

(iii) that between various methods of deductive discovery. The one which is the subject of this paper and referred to as the method of Synthesis has the peculiar advantage of its concreteness. Obviously it cannot be used in the case of every theorem, but when it can be used its employment secures this decided advantage.

E. V. STAYNOR

AGRICULTURE AND GARDENING IN INDIAN SECONDARY SCHOOLS IN RURAL AREAS

A Scheme for a Pre-vocational Course

The Need for Vocational Bias

Why does a cultivator send his son to a secondary school? What does he hope that the school will do for his son? He wants the school to teach his son quickly and expertly, so that he will pass his examinations, and have the background knowledge to live a useful and happy life. It may be a life back in the village, or a life in the neighbouring town.

During the last few decades, however, only a small percentage of the sons of cultivators have passed their examinations easily. (They have not had the same opportunities as the sons of town dwellers.) Those who did pass have, after proceeding to higher studies, entered Government service, or one of the professions, and have married and settled down to a town life. But a large proportion of the sons of cultivators fail to pass their examinations, and many of these, not securing employment in the towns, have returned to their villages. As they have been away from their villages for long periods during their formative years, on their return to the village they find themselves out of sympathy with village life, and cannot 'hit it off' with village people. Too often, also, they do not realize their responsibilities either to their own homes or to their village.

It is with these sons of cultivators that educators in India must concern themselves, for agriculture is their hereditary occupation, and along with other cultivators they must live their life in the village—and, by virtue of their education, they will be looked up to for leadership in the village. How can the secondary school better prepare them for life as cultivators and for the responsibilities of village life?

Objects in Teaching Agriculture

The secondary school in a rural area must include the study and practice of agriculture as the main part of the S.S.L.C. course. This is already being done in some high schools, but it is usually of the 'syllabus type' and not pre-vocational agriculture. The 'syllabus type' provides for instruction in agricultural science, but provides little opportunity to give flexibility to instruction. In pre-vocational agriculture, on the other hand, the syllabus is adapted to meet the requirements of seasonal operations and the aim of the course is not only to give the students a good general education but also to prepare them for life as practical farmers.

In such cases the school will be on the farm itself and one half of the school periods, and some holiday and extra class hours as well, will be devoted to the study and practice of agriculture. This includes tillage operations and crop production, farm accounts and

records, care of livestock, vegetable and fruit cultivation, and co-operation and marketing. Through the business of marketing and of co-operative societies the school farm will be linked up with village problems, and these will provide a background for the agricultural work.

The school should be a place where there is a life to be lived as well as a place where there are subjects to be taught, and whilst at school students should not become unfitted for life as cultivators. In addition they must learn that agriculture is not a haphazard enterprise, but one that calls for planning and businesslike management. They must learn to have their minds on their work, planning and organizing, and getting up early in the morning to be at the place of work before the farm servants. They must therefore learn to discipline themselves.

The Agricultural Teacher

For the achievement of these objects much depends on the teacher. Dr S. Radhakrishnan, Vice-President of India, speaking recently at the opening of the Jain College at Meenambakkam, near Madras, said that 'the greatest instrument of education is the educator [teacher]. Give him the freedom and detachment necessary to pursue his avocation.' This is as true in agricultural schools as in others.

Provided that the teacher is interested in agriculture and has some practical ability, he need not be expert in all branches of his subject, but it will be well if he loves animals and knows how to handle them; if, for example, he can milk a cow or a buffalo, and if he can detect why the laying hens are giving no eggs. If his interest is in nature study and the care of plants, he should be able to identify useful as well as harmful insects, and to demonstrate the propagation of plants by budding and grafting. Or he may be mechanically minded, and then perhaps he will show how a motor engine works, or drive the farm tractor. If he is physically strong and experienced, he can demonstrate the ploughing of a straight furrow, or the uses of a buck scraper. If skilful with tools, he can make a hurdle or repair a gate. If mathematically minded, he can measure a field or calculate the amount of water discharged in one hour by a simple waterlift in use. Such a teacher may or may not be a technician, but if he is active and has some of the practical abilities mentioned above, he will be able to impart enthusiasm for his subject to his students.

But besides having practical ability the teacher must be able to plan and think ahead and prepare for field-work before the students arrive on the farm. For every farm operation he must see that the tools are placed ready and in order. At a school farm I visited recently the students' project for the morning was the spread of the manure over a field (the manure having been carted and heaped uniformly over the field on the previous day). But the boys were there on the field with no spades. As they saw me approaching they set to work to spread the manure with their hands. The teacher had made no arrangement

for tools to be fetched from the tool-shed! At another school the teacher showed me the spades hanging from the office wall and all shining bright, but they had no handles!

Sometimes the school management is to blame. At yet another school the management had put a capital amount into the school budget estimates for the purchase of a farm cart and a pair of work bulls, but none for recurring expenses, i.e. for concentrates and fodder to maintain the working bulls. As the teacher could not afford to maintain the bulls from his own pocket, he had no alternative but to sell them.

Again, a teacher of agriculture must be familiar with the popular posters and pamphlets published by the Department of Agriculture. In a school in a rural area, many students are the sons of the farmers and themselves handle the plough and engage in farm operations, and it is well if the teacher himself not only has practical experience but knows a little more than the students. He must be aware of the latest developments in agriculture and he should be able to suggest experiments that can be made on the school farm that will be of interest to the boys themselves. Perhaps he could demonstrate, for example, the way that the Japanese handle their paddy seedlings when they plant them out, the spacings they allow between the lines, and the manuring that has given such excellent results. And how much better if, during this demonstration and afterwards, the teacher takes off his own coat and works alongside his students as they practise such a method. It is as important that the teacher should work with his students as it is that he should have proper educational qualifications.

Syllabus and Scheme of Work

Agricultural conditions vary widely in South India. There are delta areas where, under irrigation, cultivators can be sure of two or three crops each year. In coastal areas, where they can be sure of some seasonal rain, farmers have at least one crop in the year, but in the rain-shadow regions of the interior even one crop is uncertain. The Departmental syllabus in Agriculture and scheme of work for South India, therefore, allows for variety in cultivation. Whilst schools in all areas are expected to show proficiency in the study and practice of agriculture in its broad outlines, in elementary agricultural science, in the care of livestock, and in horticulture, schools may choose, as local conditions permit, to specialize on flower and fruit cultivation or on poultry farming or on dairying. This syllabus is framed for the bifurcated or pre-vocational agricultural classes for forms IV, V and VI of a high school. Each form studies the cultivation of one cereal and one other crop; for instance, it may be ragi and cotton for the IVth form, paddy and sugarcane for the Vth form, and maize and groundnut for the VIth form. Each year the students study the details of cultivation with special reference to these crops. Parallel with these cultivation studies, the IVth form beings

the study of poultry—the incubator, its uses and its care, the rearing of chicks, the housing of fowls and their feeding, egg production, etc. The Vth form takes up animal husbandry—the handling, housing and feeding of draught and milk cattle, methods of improving cattle by selection, the judging of points in animals, etc. The VIth form gives some attention to farm accounts and records, to the work of the co-operative societies and to marketing. So much for the theory, but what of the practical side?

Practical Work

In some schools the students have shown little interest in practical work, partly because it has not been well organized, or because tools and equipment for each student have not been readily available, and partly because skilled teachers, experienced in practical work, are rare. And often, when a skilled teacher is available, the class is large and unmanageable. A class for agriculture should not exceed 20 or 25 students. When classes are larger, clearly other members of the staff must be called upon for assistance.

In the vegetable garden students work in twos and threes on their own plots and grow their rows of tomatoes or brinjals or chillies, as well as leafy vegetables and flowering plants.

But what about animal husbandry? And how are students to learn practical poultry farming? The school cannot allow students to have a free hand in the management of the school animals, but it may be that students who live in the village or in nearby villages can rear and maintain animals at home, assisted perhaps by fellow students and supervised by the teacher or some experienced person. Some schools allow students to purchase eggs and to hatch them in the school incubator. Then students in batches, under supervision, light the incubator lamp and, when the thermometer shows an even temperature of 105 degrees, place their eggs in the incubator. It is their business to turn the eggs twice daily, to see that the temperature remains even, candle the eggs on the seventh and fourteenth days, and then listen and watch for the arrival of the chicks from the twentieth or twenty-first day. A day or two later they can take the chicks to their homes and rear them there, again under supervision.

Thus, practical and theoretical agriculture can be carried on side by side. In the IVth form students have their lessons on the incubator and the rearing of chicks and then they can proceed to practise what they have learnt from the teacher. Likewise after a lesson on germination and crop production the students may prepare a nursery for ragi seedlings. After germination and at the right stage of their growth, the seedlings are planted out. The Vth form, alongside their animal husbandry lessons, practise the handling and feeding of animals in their own homes. At school they learn to judge the good points of animals and learn to hitch the work animals to a cart or to a plough and to drive them. They also have practice in the use of tillage implements. This

practice will be continued in the VIth form where implements for intercultivation and for harvesting will also be used.

The planning of practical work will depend partly on the capacity of the students and partly upon the seasonal conditions. The whole scheme of work is based on a seasonal calendar.

Examinations

The University of Madras has stipulated that the maximum marks for agriculture and elementary science shall be two hundred. These are allocated as follows:

Agriculture (Theory)...	...	...	100
Agriculture (Practice)...	...	...	50
Elementary Science (Ag.)	...	...	50

The theory paper is divided into two parts.

Group A which covers general outlines of agriculture, livestock and vegetable gardening. It carries seventy marks.

Group B covers the special subject, either flower and fruit cultivation or poultry farming or dairying, and carries thirty marks.

In the practical examination marks are allocated for such operations as ploughing a straight furrow, making out a 'score card' for a stud bull, or preparing a mango graft. In this some marks are reserved for class records and also for a *viva voce* on the basis of the class records.

The writer hopes that at an early date the University will arrange for the total marks to be *equally* divided between the theory and the practice of agriculture.

After Leaving School

It is well if during their school days students are helped to realize that as cultivators they are 'workers together with God'. They plant and water, but the growth comes from God. And again, that as cultivators they are trustees of a few feet of the earth's surface which is God's choicest material resource, and that upon them rests the task of passing on the soil in its richness to future generations. And again, that as Indians they have a great duty to meet the needs of their country in respect of food production. With an increase of 39 per cent in the population during the last four decades, the available food grains from internal sources has shown an appreciable decrease *per capita*. Increased food production is necessary. After leaving school, therefore, they should practise and persuade others to practise on their own lands three basic improvements which do not require large capital nor highly trained technicians. First, millions of acres are losing their top-soil by erosion. The remedy is well known and can be applied by the cultivators themselves with their own cattle and labour. Tilled land has to be embanked and terraced, pasture land must be closed to grazing, and the grass cut and carried to the cattle. The result is miraculous; fertility and sub-soil moisture rapidly increase. Second, cattle manure

is wasted because cultivators will not dig the pits so necessary to preserve it and because their wives will use it for fuel. Third, in order to conserve the moisture in the land, it is necessary to stir the soil often—the rule is that 'every irrigation should be followed by a cultivation'; to make this possible crops must be sown in lines and not (as so often) broadcast.

In Conclusion

It must be remembered that this course in agriculture is a prevocational one. No doubt much productive work can and should be done by the students whilst at school, but on leaving school they have *not* become skilled ploughmen or farmers or gardeners. They have been *fitted to become* farmers. And the work of the school will have been integrated with the life of the community so that, in the words of the Planning Commission, 'these centres of education can themselves make a useful contribution to economic and social progress'.

F. Maltus Smith

DYNAMIC METHODS OF TEACHING

Link up Subject-matter with Life Situations

IT HAS to be admitted that a shift of emphasis has occurred in the field of teaching—from the animistic, individualistic and instructional method to the modern activity and group method. The old method was worked on the basis that individuals grow at the same rate, and the same degree of attainment should be expected from all if the same instruction is offered. But the old practice has been proved to be inadequate for several reasons, and it has been established that methods of teaching have constantly to be adjusted to individuals who are liable to dynamic changes at a rate and at a speed much beyond the estimated assumptions of teachers and administrators. Today we speak of 'total education' instead of 'acquisition of information' on a particular subject. We want our younger generation balanced enough to cope with the problems of life in an intelligent way. Training in the approach to subjects in a rational, intelligent and justifiable way, should be begun at an early age. The habit of intelligent analysis of subjects through active group participation, so often lacking in our classrooms, is the most important means of instilling knowledge and education in young people who are eager to shoulder the responsibilities of life with adults but are so helpless in finding ways of doing so. Hence our methods of teaching in each subject should have two aims: (i) to link up the subject-matter of the syllabus with actual life situations and (ii) to help pupils to participate in the activities of the lesson so that through actual participation in groups, and through mutual recognition, they may understand things in their proper perspective.

In this connexion, it is imperative to discuss the relation between the teaching personnel and the methods of teaching, as the two are so inextricably tied up. The feeling expressed in

> What you say I do not hear,
> But what you are thunders on my ear.

is absolutely true from the student's point of view so far as his learning is concerned. A teacher's technical abilities are indispensable but his personal education and human quality form the integral part of successful teaching. His scholarship, ideals and the actual practice of these ideals in life have long been emphasized in our country, but at the same time we have neglected the value and nature of the technique of teaching to a great extent. On the other hand, too great an emphasis on technical equipment at the cost of human quality and personal scholarship may bring about more serious consequences in teaching, as teaching is mainly based on an exchange of human emotions, desires and opinions. Teaching does not merely mean the transmission of facts and information. It is also an attempt to instil knowledge in young people who are filled with a profound sense

of enjoyment and a keen sense of curiosity. Admitting that the exchange of personal emotions and ideas and ideals between the teacher and the taught does hold the most important place, yet in this age of science, when advances have taken place in every field, the method or technique of teaching must be devised on scientific lines.

Much importance has been given to 'methodology' in the courses in our training colleges, but most of our efforts are still rather theoretical in nature. The practical significance of the theory must be experienced by a student-teacher in the actual activity of the classroom. The suggestion of the Secondary Education Commission in this respect, that students should observe a few good lessons before starting any teaching practice, is a valuable contribution no doubt, but mere observation will not solve all the problems which the student-teacher is likely to meet. Thoughtful and systematic discussions with a view to clarifying and actually handling some of the difficulties of classroom situations is an indispensable substitute.

At this stage, attention must be paid to how a teacher begins a lesson, whether he or she tackles the problem in a simple and interesting way, sufficient to rouse the curiosity, interest and enjoyment of all the children in the classroom, and to lead them to spontaneous participation in the activity. Pupils will be inspired to explore not at the order of the teacher, but only if the subject becomes so much a part of their own ideas that they put in spontaneous efforts to carry on the work once started. In most lessons in our schools little opportunity is offered to the young pupils to participate in the lessons. The teacher says something, the pupils are supposed to listen carefully and to reproduce. It must always be remembered that adolescents at the secondary stage are extremely eager to share adult experiences, and are desirous to find a rational link between the subject taught and actual life situations. They like to experiment with what they have learnt. If such opportunities are denied them, they become more or less sceptical about the object of learning at all. If we attempt to force 'inert ideas' on our young people we deprive them of the opportunity of using their intelligence and they become incompetent to deal with any subject intelligently. If we insist on their merely memorizing things we cannot expect them to utilize these isolated memorized facts in life situations when need arises. If they take an active part in the things studied in the classroom a gradual development towards more sharpened thinking and a less blurred understanding takes place in the individual, assisted by companionship, teacher-pupil relationship and the educative environment. The fact that a pupil is a living entity, with powers to discuss, experiment and judge, can never be ignored in devising any teaching methods. From the earliest age, pupils must be given opportunities to participate in the activity programme, so that with sufficient ease and competence they can form independent and original opinions about the things taught. The blame that is so often imputed to young pupils for their blurred comprehension and

irrelevant and incorrect expression should justifiably be attributed to the methods of teaching. Teachers often do not introduce and deal with their subject in a systematic way, and they fail to attract the full attention of the pupils because their questions are not graded, relevant or deductive.

The responsibility of the language-teacher is important. The habit of correct comprehension and expression may conveniently begin in the mother-tongue lessons and this can be continued intelligently in other subjects. It is fortunate for our children that a foreign language as the medium of instruction is no longer allowed. This has increased the responsibility of the vernacular teacher. His lessons will have to be well planned and graded. The teacher must know quite clearly beforehand what he is going to do in the classroom. If he does not, his lessons will be failures. Students should not be allowed to leave behind, within the four walls of the classroom, what is learnt there. That is why 'verbalism', which has been a popular practice in our schools, has been so vehemently condemned in the Secondary Education Commission Report.

The overemphasis on the value of verbalism has not helped our young people, but on the contrary, it has retarded their progress, being itself an unnecessary burden. Adolescents, who are eager to relate what they read to their everyday experiences, are disappointed when they fail in establishing this relationship. Our secondary school teachers must be well aware of this inevitable disaster and as an indispensable remedy must make the significance and worthwhileness of the teaching material clear to their pupils so that the young people may 'learn by living'. The importance of a systematic, relevant and a graded talk or questions in a lesson is therefore so emphasized because the right selection actually opens many doors to the pupils to think, to judge, to create and to enjoy. In this way a proper sense of values can be offered to the adolescents, who will assimilate them into their own experience.

In this connexion it is fair to mention again the importance of a teacher's own education and scholarship. He must have a considerable amount of knowledge in many subjects so that two or three subjects can be correlated efficiently. Successful correlation of subjects taught in the classroom may help the teachers themselves to a great extent to cope with the problem of completing a heavy syllabus. Such correlation will widen the mental horizon of the pupils, who will then be able to see the relative positions of things taught, and in the correct perspective. In this particular process pupils will evaluate and judge for themselves the purpose of learning different subjects. They will also realize unity in the fundamentals of life. Projects undertaken by the pupils themselves, guided by the teacher, will facilitate this correlation of the various subjects. Assignments of varied difficulty may be allotted to pupils. Two questions are to be considered here: 'How can projects be best organized when so much time has to be

devoted to the preparation for examinations? And how should projects be planned when pupils of different levels of intelligence are mixed up in a classroom?' Both are problems which impede the planning of a thorough and appropriate method. It is however the duty of the training colleges to start educational research on a wide scale, to establish a standardized test of intelligence and remedial measures to be adopted at each level.

Bearing in mind these defects and handicaps teachers must be prepared to fight the difficulties with whatever equipment is available. Plans will have to be made with a clear eye to the gifted, normal and backward pupils present in the class. Teachers must be made aware of the bad effect resulting from unsuitable reading material that is often offered to young pupils. In teaching, methods are so interconnected with material that we cannot ignore this fact. However, with all these admitted defects which should be gradually removed, teachers must be well-read and well-informed and their methods should always be consciously thought out. They should remember that, to be successful, methods of teaching must be dynamic in nature. Therefore, they are advised to have open minds and to try out varied methods without undue prejudice, care being taken in the selection of the most suitable method for a particular group of pupils in a particular situation.

This wisdom can be acquired through various processes. Teachers' study circles are useful; for in them difficulties arising out of the methods followed in the classroom with different sets of pupils can be discussed. The teachers should also be acquainted with as much literature on methods of teaching as possible. Some schools, due to financial stringency, cannot provide teachers with adequate literature, yet if there is full co-operation between teachers of different institutions, some of the problems of getting up-to-date literature may be solved. Teachers of different subjects or of different institutions should not allow any feeling of animosity to arise out of a sense of competition. They should carry on regular discussions amongst themselves. In addition a short refresher course should be insisted upon. Teachers will often find adequate materials to plan their lessons on improved lines after attending these refresher courses. Teachers are after all human beings—they want to shake off the monotony and drudgery of 'methods' and need new inspiration to experiment with human material. The refresher course may offer them much scope to revaluate the methods they have been following and the methods that could possibly be adopted.

In addition to this, every individual teacher may form a habit of self-assessment in as objective a way as possible, so that he or she will be aware of the defects in the lesson. If children of fairly high I.Q. fail to respond appreciably in a lesson for a considerable length of time, there is reason to believe that the defect is probably in the lesson being taught. When this occurs, teachers should immediately revise

their lesson plans. Many teachers of long experience may object to keeping a record of such self-assessment on the plea of their recorded experience, but they should remember that these records will probably help them to adopt more objective methods. All teachers must spend some time on the aim, method and application of a lesson, and in each application opportunities should be offered to each individual to share in classroom activity. Pupils of their own accord will soon realize that these classroom activities are no longer the activities of the school alone but are the activities of real life.

In short, teachers must assess every part of their technical equipment —they must be thoughtful, wise, and imaginative, determined to inspire and lead the young to competence, conscience and co-operation, which constitute the fundamentals of education.

A. Bose

THE ROLE OF THE TEACHER

True Education must centre round our Ideals of Life

IT IS being repeatedly pointed out from many a platform that the teaching profession carries with it little or no respect from society. One of the reasons for this is the poor monetary return for what the teacher does. But there are two other important reasons which contribute to this lack of respect for teachers both from pupils and from society in general. First, there is an inherent dislike in every individual to be taught and to be given advice. How often do we hear people protesting, 'I can stand all that but I cannot tolerate his trying to teach me'? This dislike is actually carried over from childhood. The child intensely dislikes being taught certain things. This hatred is as deep as the conflict between 'the pleasure principle' and the 'reality principle', mentioned by psycho-analysts. All advice supports the latter and hence it is opposed to the former. Throughout the years of growth man seems to carry a little of this conflict with him and consequently dislikes being taught. Secondly, the real goal of teaching and the achievements of the teacher are to a large extent intangible, as they refer to the distant future and less so to any urgent need felt in the present time. If a bridge has collapsed it must be put right as soon as possible and the engineer must be called in, and the quality and quantity of his services can be measured then and there in a definite quantitative form. It is the same with physical illness. A doctor must be consulted and the benefits of his services are almost immediate. But it is quite a different matter with the role of the teacher. He teaches the child to enable him to live as a useful and successful citizen—ten, fifteen, or twenty years hence. How far the child has been taught to think correctly or to live well can never be gauged at one particular time. We do not mean by this that the teacher is unconcerned with the present life of the pupil. Unfortunately, our whole attitude towards education is such that we think of it only as a preparation for an examination which is a qualification for a job. The aim of the race is to reach somehow, and as soon as possible, the end of the course which leads to a degree, a qualification. The teacher is considered as just an aid in the whole process, no more important than a book of notes and annotations, which is thrown away after the examination. Consciously, or unconsciously, many teachers themselves slip into such a role. But, if the teacher keeps the true aim of preparing the child for life before him he will endear himself to his students, and will win an affection and an esteem that will be enduring.

In recent years much thought has been given to the reorganizing of educational systems all over the world. Many slogans have evolved from this: education must centre round the school and community, the curriculum, a craft, the child (meaning the innate psychological

make-up of the child) and so on. Each one of these aspects has its own truth, but it also holds the possibility of narrowing the scope of education if emphasized beyond a certain point. True education must centre round our ideals of society, our ideals of life itself. Educational psychologists have given us information about organizational matters, reorganization of the curriculum, scientific methods of instruction, and audio-visual aids. But we do not hear enough about the aims of education. Unless and until there is general agreement and enthusiastic conviction about the true place of education in the life of an individual, the role of the teacher is bound to be vague and confused. Here we need our poets and philosophers, and our prophets and saints.

We are just emerging from a controversy on the media of instruction. This is an important problem, but it refers only to a very narrow aspect of education. The real media of instruction are the subjects of the curriculum. All the subjects, mathematics and history, science and drawing, languages and social studies, are equally important media for educating the pupil, for teaching him things that are of permanent value and usefulness, making him fit to live as an individual and in society. It is not difficult to list a few of the values which should form the aim of education.

1. Correct thinking and correct expression. Children should be taught to observe accurately and think correctly. Correct thinking will guard them against personal and social prejudices. One of the evils of our society is the free-and-easy manner in which hasty and obviously untrue generalizations are made even by so-called educated people. For example, in a recent investigation into the stereotyped attitudes of individuals towards other communities and groups, persons with high academic qualifications, teachers, university professors, and lawyers were prepared to attribute adjectives such as, immoral, moral, intelligent and dark, to vast masses of people such as Tamilians, Brahmins, Hindus, Muslims, non-Brahmins. Correct thinking should also include correct expression and speech. Children should be taught to avoid not only falsehood, but also exaggeration. Speech should not offend either the rules of grammar or the feelings of others.

2. An educated person must be able to enjoy the beauties of this life and the universe. This appreciation has to be acquired to a large extent. There is much beauty in nature, in the various fine arts and above all in human character. From an early age children should be taught to appreciate nature, the arts and noble characters. In the latter, race and time should be no hindrance. Most of the subjects in the ordinary curriculum of a school can be used to inculcate in the children this sense for beauty and good.

3. Pursuit of moral values. Unlike the young animal the human baby needs to be taught the art of living almost *in toto*. This training involves learning to control and restrict innate instinctive urges. In other words, a deep sense of moral discipline must be inculcated in every child. Education must help every pupil not only to appreciate

moral values but also to pursue them. As we pointed out earlier, the child may not like this training, but with proper handling, the resistance can be overcome.

4. Co-operation and co-operative living. The aim of education is to make a person fit to live as an individual and as a member of society. Conditions of living are such that unless we learn to live and to work together we may not live at all. This does not mean that group-living is a necessary expedient. There is much joy in human fellowship, and the child must be taught to develop and enjoy such ideals. J. B. Priestley brings out the importance of inculcating the spirit of co-operation in our children when he says 'contemporary man is essentially a co-operator and it is precisely his capacity for team-work and communal effort that distinguishes him from other historical types. Individually we are not as brilliant as the Elizabethans, but in co-operation we can do things that would make their hair stand on end.' There is too much competition in our schools and not enough co-operation. Adler has shown us the evil effects of the spirit of competition in producing that inferiority complex which has such devastating results in the neurotic disintegration of character, and the destruction of social feeling. Training for communal life will also include the proper development and control of all emotions. The latter is essential for the former.

5. Finally, children must be taught to recognize and acknowledge the power and glory of God. Whatever a few people may say against religion, the child must be taught to see with reverence and awe the hand of God in nature and in human life. Under the pretext of secular education teachers are reluctant even to mention the name of God within the classroom. If God is the highest truth taught at home then He cannot be shut out of the school premises. Attention could be drawn to the power and glory of the Creator while learning the names of the parts of a flower. The student of physiology and anatomy learns with great diligence the intricate structure of the nervous system and the parts of the body. Does it not come within the role of education to point to the perfect and beautiful way the whole complicated structure is organized into one unity? May it not be equally relevant to create a sense of awe and reverence in the mind of the student for God, the Maker of Heaven and Earth? The role of the teacher, then, is to lead the pupil with the help of the classroom subjects through the labyrinth of the Great Temple, the Universe, with all its multiplicity of life and grandeur.

G. D. BOAZ

SECONDARY EDUCATION IN INDIA

Its Malady and Remedy

THERE is widespread popular discontent against the present system of education. It is an indisputable fact that the system is far from satisfactory and is ill-suited to the needs of the country. Our secondary education constitutes the weakest link in our educational machinery, and requires urgent and complete overhauling.

The Secondary Education Commission appointed in September 1952 under the distinguished chairmanship of Dr A. L. Mudaliar have spotlighted the following basic shortcomings and defects of our present system:

(*a*) Firstly, it is 'isolated from life' and does not give the students 'insight into the everyday world in which they are living'.

(*b*) Secondly, it is 'narrow and one-sided'. It does not 'train the whole personality of the students', and particularly ignores the 'non-cognitive aspects' of his personality.

(*c*) Thirdly, until recently, it was too heavily dominated by English.

(*d*) Fourthly, the methods of teaching in vogue are generally 'mechanical', aiming at 'giving information' and not at the development in the students of 'either independence of thought or initiative in action'.

(*e*) Fifthly, the size of classes has become too large to permit of 'personal contact between teachers and pupils', resulting in the deterioration of efficiency and discipline in the schools.

(*f*) Sixthly and finally, the current system of education is heavily dominated by the examination, which 'has tended to curb the teachers' initiative, to stereotype the curriculum, to promote lifeless and mechanical methods of teaching' (see the Report, pp. 21-2).

This list, though not exhaustive, focuses attention on the fundamental weakness of the system. All these defects spring from and are rooted in the wrong notions prevailing in our country with regard to the objectives and functions of education. They have their source in the very origin of the system.

The foundations of this system were laid in the first half of the nineteenth century, when, following the famous Macaulay Minute, Bentinck's Government decided to introduce English education and to utilize all the funds set apart for this purpose for the promotion of 'English education alone'. In order to popularize it among 'the natives of India', it was declared in 1844 that 'for service in public offices, preference should be given to those who were educated in English schools'. At the various stages of the educational set-up, the system of public examination was provided, the passing of which

opened doors for educated youths to the different grades of service in the administration. This policy has engendered in the minds of the people wrong ideas about the purpose and character of education. It has led to the belief that the aim of education is service in the Government and that the passing of examinations is the only requisite. Thus the passing of examinations has become the be-all and end-all of education in our schools, which function like factories turning out youths for Government jobs. These ideas have become so deep-seated that they dominate and vitiate the entire educational system, giving rise to all the basic defects spotlighted by the Commission. Any reform can only be effective if these wrong ideas and attitudes are totally rooted out.

The present popular discontent directed against the educational system does not however proceed from a perception of the defects or its wrong objectives pointed out above. The people attack the system because it increasingly fails to fulfil that very objective, namely Government employment, which so adversely affects it. Hence the reforms generally suggested are either 'the vocationalization of education', or restriction of educational facilities, or the opening up of new avenues to employment for the educated. The main complaint against the system is that it is creating unemployment among educated youths. It is high time that it was made clear that no education system by itself can solve the question of unemployment. Unemployment results from maladjustments in the social economy of the country. In a well-planned society in which work, wages and leisure are equitably distributed, the problem of unemployment, whether for the educated or the uneducated, cannot arise. The point to be brought home to the people is that the solution for unemployment is to be sought not so much in education, as in social replanning. In the new democratic set-up, the restriction of educational facilities to the few cannot be tolerated for long. Nor is mere vocationalization of education of much help. It would only shift unemployment from one sector to the other. It is also clear that the multiplication of white-collared jobs for the educated cannot continue indefinitely, and can hardly keep pace with the turn-out of the schools. What is needed is the radical reconstruction of national life on a well-planned basis, and in this task of reconstruction, education has a very important role to play. But in the absence of social replanning, education by itself can offer no satisfactory solution for the problem of unemployment. Trying to solve the problem by restricting educational expansion is like combating famine with suicide.

For the reconstruction of our educational system, the formulation of right objectives is required and this presupposes a clear vision of the new social order which we want to set up in our country. This may land us in the field of philosophical and ideological controversies, but there is no escape. There are some who advise those who are connected with education not to bother about these questions. But not

to bother is to maintain the *status quo*—this will not improve matters. It is, therefore, essential that we should be very clear about the picture of the new social order in the country. Without it, our reformative measures will result in mere patchwork.

Fortunately for us there is a very large amount of unanimity of opinion in regard to the basic principles and broad features of the new social order to be set up in the country. Our ideal, which is embodied in the Constitution, is a democratic co-operative commonwealth in which everyone, without any distinction of caste, creed, sex, language, province or status, may enjoy full and equal liberties and opportunities for their self-expression and the development of their individual personalities. In it there would naturally be no concentration of power and wealth in the hands of the few, and co-operation would predominate over competition, moral excellence over material possessions, devoted service over self-aggrandisement, and creative labour over parasitical living.

Our new educational system should be inspired with this new vision of a free India. Considered against the background of this ideal, the following objectives formulated by the Secondary Commission are quite comprehensive and perfectly sound:

(1) The development of habits, attitudes, and qualities of character essential for democratic citizenship and necessary for countering fissiparous tendencies detrimental to the unity of national life.

(2) The improvement of the students' practical and vocational efficiency in order to enable them to play their part in building up the economic prosperity of their country.

(3) The development of the students' literary, artistic and cultural interests, which are necessary for self-expression and for the full development of the human personality.

These new clear-cut objectives would involve the total transformation of the existing secondary school in all its aspects. The existing curriculum, extra-curricular activities, methods of teaching, the system of examinations, training of teachers and conditions of their service, internal discipline and management of schools, all these would have to be reoriented accordingly, and with regard to each of these subjects, the Commission have made important, thoughtful and practical recommendations, which deserve to be tried and worked, and in due course to be modified in the light of actual experience. But the prerequisite condition is the right spirit, born of the new ideals.

The recommendations made by the Commission with regard to two very important subjects, namely (i) the duration of the secondary stage and (ii) the size of the schools, deserve attention, as they do not seem to be in keeping with the principles laid down by Mahatma Gandhi. For the new structural pattern of education the Commission have recommended a seven-year course for the secondary stage, covering the

age-group of 11 to 17 years. This would, in practice, mean the mutilation of the Basic course of education as conceived by Mahatma Gandhi. In place of the prevailing five-year course of primary education aiming at literacy, Gandhiji suggested that the minimum education which should be provided on a free and universal basis should be of seven (now extended to eight) years' duration for children from 6 to 14 years of age, and should come up to the present high school standard without English. This course would equip the students with sufficient basic knowledge, skill and aptitudes to enable them to carry on their further self-education, provided they had the will to do so. This whole course, very appropriately called Basic, was conceived as one 'integrated whole'. Now to cut up its three upper classes and take them on to the secondary schools does not seem to be a very progressive step. The Commission have cautioned, however, that 'particular care will have to be taken to ensure that the education imparted during the first 8 years in the primary (or Junior Basic) and the middle (or Senior Basic) stage forms an integrated and complete whole'. But, with all due deference to the Commission, it may be submitted that the integrated character of the Basic course is, in actual practice, likely to be marred if the middle or Senior Basic stage forms a part of the secondary course. It can be better preserved by excluding the three upper classes of the Basic course from the secondary schools. There should be eight years for the Basic and four years for the secondary (or post-Basic), each stage being considered as a complete whole by itself.

With regard to the size of the schools the Commission have made the following observations:

'We regret to say that we have come across schools where the total number of pupils has exceeded 2,000, each class being divided into 8 to 10 sections. The excessive number has led to a great deal of laxity, not only in teaching, observation and recording of the work of individual students, but also in the maintenance of discipline, and in the relationship that should exist between the teacher and the taught. Schools under such circumstances have to work like factories and the bad effect on the education imparted to children of such schools can hardly be exaggerated."[1]

We should be on guard and try to rescue our schools from this tendency. Large enrolment and huge buildings may be impressive to look at, but this does not contribute, but is, on the other hand, very inimical, to the inner enrichment of life. If we sincerely aim at the cultivation and development of individual personalities, the size of the classes and the school as a whole ought to be very much curtailed. The recommendation of the Commission in regard to this point runs as follows:

'The optimum number of boys to be admitted to any class should be 30 and the maximum should not in any case exceed 40. The

[1] *Report of the Secondary Education Commission, 1952-3*, pp. 195-6.

optimum number in the whole school should be 500, while the maximum should not exceed 750.'[1]

The optimum as well as maximum strength fixed for a class is acceptable, but the numbers fixed for a school as a whole seem to be still very excessive. The optimum and the maximum strengths of a school should be 300 and 450 respectively.

Given schools of a moderate size with an atmosphere surcharged with idealism springing from the vision of a new social order, and given teachers sincerely fired with the new spirit and equipped with a type of training in harmony with the objectives of the new education, our schools would not take long to be transformed from dull places of formal learning into living centres, training young children in the supreme art of living. Sincerity of purpose is very essential for the achievement of the new objectives set for the new education. Loud lip-homage to high ideals, but the old traditionalism in practice, are serious flaws in our national character. Let these not be allowed to mar our educational efforts.

Only in this new atmosphere could the schools come up to the standard laid down by the Commission in Chapter XV of their Report. The various subjects provided in the curriculum would then no longer be taught in a traditional and formal manner for mere examination purposes, but would be fully exploited for the enrichment of the pupil's personality. Nor would the methods of teaching be considered as 'mere devices for communicating certain items of information', but would be dynamic in conception and character, aiming at 'their end-products, namely, the attitudes and values inculcated in the students consciously or unconsciously'. Learning would not remain bookish, confined only to the four walls of the classroom. Distinction between the curricular subjects and extra-curricular activities would disappear. All activities calculated to help the all-round growth of the students would be equally valued. A new approach towards examinations would also then be possible. They would not be looked upon as the be-all and end-all of education, but would be conceived as the means and methods of measuring a pupil's attainments and inner endowments. Planned for life, these schools would be the seats and sources of light and life to the surrounding community, of which they form an integral part.

Provided the new ideas about education are widely broadcast and become deep-seated in the minds of the people, society will soon take steps to accord to its teachers adequate salaries in keeping with the principles of the new order, favourable conditions of work, security of tenure and a due place of honour. It is abundantly clear that teachers, financially worried, socially disregarded and insecurely placed, can never be expected to train full-blooded, free and creative citizens, though they may succeed, as they have been doing hitherto, in turning out bookworms.

[1] *Report of the Secondary Education Commission, 1952-3*, p. 206.

The management of the secondary school in the new atmosphere would also undergo an automatic change. A large number of these schools are under private management and conditions in them are unsatisfactory. Disgusted and distressed with the prevailing conditions in such privately managed schools, many of us cry aloud for the total nationalization of these schools. But to nationalize them is to bureaucratize them—a feature hardly congenial to the creative atmosphere needed for the new education. Schools in future should be looked upon as co-operative enterprises in which teachers, parents, educational officials, and even the students themselves should be working hand in hand and managing the affairs of the school in a self-disciplined manner.

We now want our schools to function as little communities where pupils may be able to build their bodies, develop their health, sharpen their intelligence, refine their hearts, enlarge their interests and outlook, and acquire such knowledge, skill, habits and attitudes as will enable them to live nobly and efficiently.

The root of the malady lies in the wrong notions about education which dominate our schools and the minds of the people at large. To reform the system the debris of these rotten ideas will have to be swept off, and new ideals and objectives installed in their place. For this education is necessary. Thus the remedy for the present system of education is education itself.

MOHAN MURARI

CITIZENSHIP TRAINING AND INTERNATIONAL UNDERSTANDING THROUGH GEOGRAPHY

An Opportunity for Schools to Contribute to World Peace

Introduction

A HUMAN personality is nothing apart from his environment. Admittedly, one individual may differ widely from another in the mental and physical potentialities with which he is endowed at birth. But these potentialities need a suitable environment in which to develop. The seed cannot grow, the plant cannot blossom, unless the soil and the climate are favourable.

But, unlike a mere vegetable, a man not only responds to his environment, he takes active cognizance of it. If we want our young people to grow into happy, mature, well-balanced adults, we must be at pains to familiarize them with the complicated and confusing environment into which they are born. We must give them opportunities of finding out something of the inter-relatedness of the things around them and of learning something of the bonds that link them to their material and social surroundings. Only in this way can we prepare children for the task of personal adaptation to the civilized life of today. Hence the duty of the modern adult citizen is to play his part as a member of the society into which he has been born.

Any course of study is to be judged by the extent to which the interests and enthusiasms of the child are stimulated rather than by the number of items memorized or absorbed. We have first to ask ourselves what the child needs to know in order to be an effective personality and a useful citizen in the modern world. When that has been agreed upon, our next task is to present the requisite material in as lively and as co-ordinated a fashion as we can, so that the young pupils may co-operate willingly and actively in their own instruction.

Hence a well-designed and well-conducted course of Social Studies can fulfil all the main educational requirements of a field of study. It will satisfy the need of the child to understand his environment and his relations with it; and it will go far to satisfy the need of society for well-adjusted citizens, prepared to participate in solving the pressing problems of our times.

Let us now consider how far the study of geography influences the minds of the young in the training of citizenship and in the knowledge of international understanding.

Citizenship Training through the Study of Geography

Geography is defined as the science which deals with the sum total of human effort in relation to the environment in which human life is passed. It is an essential element in the training of the numerically most important part of the future citizens and voters.

So then, the contribution of geography to the teaching of citizenship is to be found in the possibilities it offers for developing a sympathy for the lives and problems of other people. Geography should be approached from the human standpoint. This places man at the focus of all geographical studies and subordinates the study of the physical side to the human. The world is no longer regarded as an object of curiosity, like some exhibit in the vast museum of the universe, but as the workshop, the playground and the home of man—the conqueror, overcoming his geographic limitations, making the most of his environment and ceaselessly striving to lighten the burdens of his existence. The main aim of geography is to turn out a good citizen and not a good geographer.

The value of teaching geography for citizenship largely depends upon the reality and vitality with which the subject is presented to the child. While the political and social aspects of citizenship are stressed by the study of history, geography deals with the economic aspect of human life. It is no longer enough that a citizen should know his duties and rights as a citizen for, in order to play his part effectively, he must know the elements of economics, because industry and commerce are becoming more interwoven with politics. Through a study of the physical geography of a country, the student is at the same time taught the historical development of the social, industrial and agricultural activities of the people of the country, its present organization and its social services. Secondly it shows the economic interdependence of nations which is necessary to intelligent citizenship.

An engineer can be a perfectly good engineer if he understands how machinery works and how he can direct and control it, but a citizen cannot be a perfectly good citizen merely because he understands how the state functions and what his civic duties are. A machine is made up of static components which function in a manner determined by the engineer, but a state consists of dynamic individuals, so that to attack problems within the state without taking into account the individual and the collective personalities of its members is to court disaster.

Hence the greatest value of geography lies in arousing in the individual a feeling of good citizenship, not only in relation to the home district and the country, but also to the world at large.

Knowledge of International Understanding through the Study of Geography

In the study of Social Studies, especially in geography, young people are actively engaged upon the co-operative exploration of the history and environment of mankind. They are learning that living and doing inevitably create problems, and the good solutions are not to be found by blame or by taking sides and fighting for mastery but by tackling a difficult situation as a whole, from as many angles as possible and with as much co-operation as possible. They also find out that men and

nations are indeed 'members of one another'. It is by experience within a social situation that attitudes are most easily formed or changed. The study of geography also helps to get rid of frustration, aggression and guilt feelings which, if unresolved provide the raw material for attitudes of antagonism between peoples.

We see then that the study of geography is not only concerned with the subject-matter of the human struggle, thereby promoting an understanding of the effects of co-operation and the effects of war. It also provides the experiences and situations through which the attitudes and emotions of fellow-feeling with others and of co-operative usefulness are built up at the expense of those making for aggression and destructiveness. Through the study of geography, the schools have an opportunity to really contribute to world peace.

To conclude, in geography we must try to trace with the children the fascinating story of how man has developed through the ages, how he has studied to use and control his environment and how his life has been influenced by this. Man's struggle with his environment yesterday and today, man's use or misuse of his powers and resources, his development, the essential unity of civilization, these are the main themes of the study of geography.

R. IRUDAYARAJ

BOOK REVIEWS

L. D. ADAMS: *A Background of Primary School Mathematics.* (Oxford University Press, 1953). Cr. 8vo., pp. xvi + 190, 8*s.* 6*d.*

To the reviewer, who has for many years been concerned with the teaching of mathematics, this book brought a pleasant surprise, for this is the very book he had been looking for. It fills a vital and long-felt need.

The object of the book is to give the teacher the necessary background for general teaching of primary school mathematics (up to the age of 11). The arrangement is according to ideas.

The author has drawn fully from his wide experience as one of H.M. Inspectors of Schools and a member of the primary school sub-committee of the Mathematical Association in England. He has included examples of children's work which were given him by teachers and students in training who knew of his interest in the mathematical development of children. These examples are not of mere computation but are of 'work accompanied by verbal recording and by pictures'. These, with the stories about children that are also included, not only afford the reader original sources for his study, they introduce an atmosphere of liveliness and reality in which the author's simple and lucid style makes fascinating reading.

Unlike the general run of writers on the teaching of primary school mathematics, this author develops his theme along the generative aspect of the relevant mathematical ideas.

To treat each idea or process in as sound a psychological manner as possible with regard to maturation, concrete context and individual interest and experience —and many of the books available do this well enough—is not sufficient. The ideas must be treated generatively.

It is difficult to explain this point fully in a review but the following examples taken from the book will illustrate what is meant. (i) Emphasis is laid on counting in groups (in twos, threes, etc.). This is more fundamental than a knowledge of the multiplication tables because it is more generative of the ideas that lead to notation and value. (ii) The early use of fractions for the purpose of comparison adds generality to the former $\frac{a}{b}$ and that very generality adds new significance to the part-of-a-whole idea.

Mathematics develop along the lines of its generative ideas and in the long run the only genuine way to learn or teach the subject is along the same lines. Moreover, the generative ideas supply what may be called the objective motive in learning. The claim here being made is not an Herbartian one, but just that the mind inevitably seeks satisfaction in knowing the relation between things and seeing them as a patterned whole.

To know mathematical ideas from this point of view and so to teach them requires mathematical insight. It is for lack of this insight that so much mathematics teaching is ineffective.

This book will surely go a long way to develop in the teacher the required insight. Mr Adams' approach is similar to that of Mary Boole, from whose work he takes many of his 'texts', and the present work places him in the distinguished company of herself, Benchara Branford and David Mair.

The publication of this book would be amply justified on the above consideration alone, but in the other principles of teaching practice his treatment of the subject is equally excellent.

In discussing the development of each idea the author points out the need for the sanction of individual experience, and that the starting point should be the use, personal or social, to which the individual pupil already puts the idea. The treatment then should be the affording of the necessary environmental context to vary and enrich concrete experience to pave the way to freeing the idea sufficiently for symbolic expression. The social or personal interests which bring this about supply the subjective motivation in learning.

It is interesting to note that the author prescribes for dull children an intensive treatment of the same kind as for the bright. This will encourage teachers to get away from the widespread practice to teach dull children only by rote, leaving the bright ones to learn by insight. Dull children usually lack both ability and variety of experience. Their needs are to be met not by methods that will blunt whatever power of insight they do possess, but by enriching their experience to give that power the utmost assistance.

* * *

Progress of Education in India, 1947-1952. Quinquennial Review (Ministry of Education, Government of India, New Delhi, 1953). Demy 8vo., pp. vi + 274, Rs 2-10.

Whilst the modifications in the quinquennial review which have facilitated early publication may be welcomed in any other year, the initiation of the changes just now are rather unfortunate. We have had two extensive reports—on university and secondary education—and the general position has been well surveyed in them. There is little more that can be communicated in a quinquennial review except more recent statistics—and that is not naturally possible in a review which practically follows the close of the five-year period. The value of the alterations introduced, therefore, is to be seen in later periods—if the new style is retained.

The period may be described as one of cautious experimentation. Institutions of higher education which followed unorthodox lines—like Santiniketan and the Indian Women's University—received recognition. In Basic Education, adult literacy and technical education, the first steps were taken to build a healthy system and make up for past neglect. The Report draws attention to the drawbacks of a mechanical extension of Basic Education. 'Kashmir has always been famous for its wonderful embroidery and woodwork. In Assam, silk spinning and weaving was common to almost every household. Nevertheless, the earlier Basic schools in these areas were often restricted to spinning and weaving of cotton.' These early mistakes are being corrected. Perhaps the best advance is in the field of adult literacy where the realization of the inadequacy of mere reading and writing has led to improved methods of teaching and of holding the interest of the taught. Generally speaking, the trend in the five years has been towards developing closer contact with the environment.

Mention is made of cultural missions and the widening of contacts in the international field which do not exactly fit into an educational programme. Whilst it is true that in the past distinguished Indians, few in number, received recognition for their personal achievements and abilities, the present rather extensive sponsoring of 'cultural' and 'goodwill' missions does result in a lowering of the standards of international contact. There is one point too to which the Report might usefully have drawn attention: The support from foreign countries to educational programmes, in so far as it is only a one-way traffic and not a reciprocal arrangement, yields unsatisfactory results. Since the Report touches on the subject, it might usefully have noticed this aspect of it.

* * *

A. F. Watts: *Can We Measure Ability?* (University of London Press, 1953). Cr. 8vo., pp. 80, Rs 2-7.

There are those who look upon intelligence and aptitude tests as almost infallible. And there are those who look upon them as one of the biggest hoaxes of the present century. Both positions are about equally far from the truth. Intelligence tests come nearer to giving us a true measure of the natural ability of children than any other single attempt at measurement, but their use is limited and they can easily be misinterpreted.

The question of the 'truthfulness' of intelligence tests is a very real issue for parents in England, for England offers its children two very different types of education with very little or no choice on the part of children or parents as to what type it will be. Since the one type practically closes the door to higher education, the decision of the authorities as to what type your child will have to follow is quite a fateful one for many. The decision is made at the child's eleventh birthday. Many regard this tender age as being too early in the life of most children to permit

a well informed decision. This booklet does not go into the question of the wisdom of the English plan or the time at which bifurcation is to take place. But it does try to tell parents and teachers whether the use of intelligence tests promises more justice or less justice at the time the educational fate of their child, with its consequences for his entire career, is being decided.

The author, who is a leading authority on the subject, discusses the pros and cons and gives the reason for placing a certain amount of faith in the intelligence test. He at the same time suggests means for overcoming the effects of some of its weaknesses. The explanations are as simple and non-technical as one can expect discussion on a complicated subject to be. It is not a book for the expert, but a booklet for the layman who is concerned with the educational fate and possibilities of his or someone else's child and wants to know if the greatest possible justice is being done.

Wherever the opportunities for higher education are competitive and wherever it is bifurcated, the use of ability tests is bound to increase and parents and teachers need to understand what they are about. This booklet is a good non-technical introduction to an important issue about which there is a good deal of misunderstanding and misinformation. The issue will affect all of us, sooner or later, whether we realize it or not.

* * *

E. D. JOSEPH: *The Teaching of Science in Tropical Primary Schools.* (Oxford University Press, 1953). Cr. 8vo., pp. xx+234, 7*s.* 6*d.*

This outstanding book, being Volume I of the UNESCO Handbooks on the Teaching of Science in Tropical Schools, deals with general science in primary schools. The series continues with volumes on health, home science, arithmetic and the training of primary school teachers. The last four of the ten volumes relate to the work in secondary schools in general science, physics, chemistry and biology.

The volume under review is intended for the use of teachers of children of the age-group 6-12. Chapter I discusses the teacher's work and his attitude to science. Chapter II contains excellent suggestions for practical work and teaching methods; while Chapter III deals in some detail with material and equipment.

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Above all we appreciate the aim of the series which is to help teachers of science to realize the importance of their work in the community, and to aid them in giving their pupils a view of science as a whole. Science teaching must be based on the environment of the children. The good teacher shares the life of the community and knows and understands the children's background. He has a special responsibility to keep in touch with village or civic life, for his aim is not to produce scientists but to make better citizens.

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